

## CLAIMS

1. A user-interface method in which items are represented to a user with respective  
5 perceivable range values, the items having respective associated labels by which they can  
be addressed, the method involving:
  - (a) addressing an item by speaking its label at a loudness indicative of its perceived range;
  - (b) assessing the loudness at which the label was spoken and determining from this  
assessment a range gate expected to encompass the range value of the addressed item;
  - 10 (c) using a speech recogniser to recognise the spoken label and thus the addressed item,  
the label search space of the recogniser being restricted to exclude the labels of items  
having a range value outside of the determined range gate.
2. A user-interface method according to claim 1, wherein said items are presented via a  
15 visual display with the range value associated with each item being perceivable by  
perspective in the displayed image.
3. A user-interface method according to claim 1, wherein said items are presented via a  
visual display with the range value associated with each item being perceivable from a text  
20 label.
4. A user-interface method according to claim 1, wherein said items are represented in an  
audio field through corresponding synthesized sound sources from where sounds related to  
the items appear to emanate, the depth at which each sound source is rendered in the audio  
25 field being the range value associated with the corresponding item.
5. A user-interface method according to claim 4, wherein at least some of the said items  
represent associated services with the item-related sounds presented through the  
corresponding sound sources being audio labels for those services, the service audio labels  
30 being also the labels to be used to address the corresponding items and thus the services  
themselves.

6. A user-interface method according to claim 4, wherein the label search space of the recogniser is further restricted by excluding the labels of items represented in the audio field by sound sources that lie beyond a predetermined angular extent of the direction of facing of the user when speaking.

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7. A user-interface method according to claim 4, wherein the label search space of the recogniser is further restricted by excluding the labels of items represented in the audio field by sound sources that are muted to at least a predetermined degree.

10 8. A user-interface method according to claim 4, including a calibration phase in which a user spoken input has its loudness assessed and a range value determined for it in the same general manner as used in carrying out step (b), a feedback sound then being rendered in the audio field at a range value corresponding to that determined for the user spoken input.

15 9. A user-interface method according to claim 1, wherein in (b) the range gate is determined on the basis that the greater the assessed loudness, the further away is the item being addressed.

20 10. A user-interface method according to claim 1, wherein in (b) the range gate is determined on the basis that the greater the assessed loudness, the closer is the item being addressed.

11. User-interface apparatus comprising:

- means for presenting items to a user with respective perceivable range values, the items having respective associated labels by which they can be addressed, the method involving:
- a sound input device for sensing user speech input including the speaking of a said label by a user at a loudness indicative of its perceived range;
- range-determination means, operatively connected to the sound input device, for assessing the loudness at which the label was spoken and for determining from this assessment a range gate expected to encompass the range value of the addressed item; and

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- a speech recogniser for recognising the spoken label and thus the addressed item, the recogniser being operative to restrict its label search space to exclude the labels of items having a range value outside of the range-gate determined by the range-determining means.

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12. Apparatus according to claim 11, wherein said means for presenting items to a user comprises a visual display with the range value associated with each item being perceivable by perspective in a displayed image of the items.

10 13. Apparatus according to claim 11, wherein said means for presenting items to a user comprises a visual display with the range value associated with each item being perceivable from a displayed text label.

14. Apparatus according to claim 11, wherein said means for presenting items to a user  
15 comprises rendering means, including audio output devices, for generating an audio field in which said items are represented through corresponding synthesised sound sources rendered by the rendering means, the depth at which each sound source is rendered in the audio field being the range value associated with the corresponding item.

20 15. Apparatus according to claim 14, further comprises means for determining which sound sources lie beyond a predetermined angular extent of the direction of facing of the user, the speech recognizer being further operative to restrict its label search space by excluding the labels of items represented in the audio field by the sound sources determined as lying beyond said predetermined angular extent of the direction of facing of  
25 the user.

16. Apparatus according to claim 14, further comprises means for setting the audibility of the sound sources, the speech recognizer being further operative to restrict its label search space by excluding the labels of items represented in the audio field by sound sources that  
30 are muted to at least predetermined degree.

17. Apparatus according to claim 14, further comprising calibration means operative to use the range-determination means to determine a range value for a user spoken input, and then to control the rendering means to render a feedback sound in the audio field at a range value corresponding to that determined for the user spoken input.

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18. Apparatus according to claim 11, wherein the range-determination means is operative to determine said range gate on the basis that the greater the assessed loudness, the further away is the item being addressed.

10 19. Apparatus according to claim 11, wherein the range-determination means is operative to determine said range gate on the basis that the greater the assessed loudness, the closer is the item being addressed.

20. User-interface apparatus comprising:

- 15 - a presentation arrangement operative to present items to a user with respective perceivable range values, the items having respective associated labels by which they can be addressed;
- a sound input device for sensing user speech input including the speaking of a said label by a user at a loudness indicative of its perceived range;
- 20 - a range-determination arrangement operatively connected to the sound input device, for assessing the loudness at which the label was spoken and for determining from this assessment a range gate expected to encompass the range value of the addressed item; and
- a speech recogniser for recognising the spoken label and thus the addressed item, the
- 25 recogniser being operative to restrict its label search space to exclude the labels of items having a range value outside of the range-gate determined by the range-determining arrangement.

21. Apparatus according to claim 20, wherein the presentation arrangement comprises a

30 visual display with the range value associated with each item being perceivable by perspective in a displayed image of the items.

22. Apparatus according to claim 20, wherein the presentation arrangement comprises a visual display with the range value associated with each item being perceivable from a displayed text label.

5 23. Apparatus according to claim 20, wherein the presentation arrangement comprises an audio rendering subsystem, including audio output devices, arranged to generate an audio field in which said items are represented through corresponding synthesised sound sources rendered by the rendering subsystem, the depth at which each sound source is rendered in the audio field being the range value associated with the corresponding item.

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24. Apparatus according to claim 23, further comprises an arrangement operative to determine which sound sources lie beyond a predetermined angular extent of the direction of facing of the user, the speech recognizer being further operative to restrict its label search space by excluding the labels of items represented in the audio field by the sound  
15 sources determined as lying beyond said predetermined angular extent of the direction of facing of the user.

25. Apparatus according to claim 23, further comprises an arrangement operative to set the audibility of the sound sources, the speech recognizer being further operative to restrict its  
20 label search space by excluding the labels of items represented in the audio field by sound sources that are muted to at least predetermined degree.

26. Apparatus according to claim 23, further comprising a calibration arrangement operative to use the range-determination arrangement to determine a range value for a user  
25 spoken input, and then to control the rendering subsystem to render a feedback sound in the audio field at a range value corresponding to that determined for the user spoken input.

27. Apparatus according to claim 20, wherein the range-determination arrangement is operative to determine said range gate on the basis that the greater the assessed loudness,  
30 the further away is the item being addressed.

